

INVESTIGATING THE USE OF THE E-MAIL IN THE TEACHING
AND LEARNING OF A TECHNICAL SUBJECT AMONG
POLYTECHNIC UNGKU OMAR STUDENTS

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Among Polytechnic Ungku Omar Students

SESI PENGAJIAN 2002/2003

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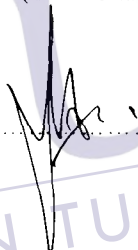
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
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ABSTRACT

Through the use of technology in education, effectiveness in the teaching and learning process can be achieved. In this project, the researcher wants to identify whether the usage of the electronic mail in the teaching and learning of a technical subject will benefit the teaching and learning process or not. Other than that, researcher wants to identify problems faced in applying the electronic mail in the teaching and learning of a technical subject among Polytechnic Ungku Omar students. Respondents of the project were one class of Polytechnic Ungku Omar students who were taking Data Communication subject. There were two research approaches used in getting the data which are qualitative approaches and quantitative approach. Qualitative data includes data collected through observations, interview and content analysis. Quantitative data includes data collected through questionnaires. Data collected reveals that participants used the e-mail in different ways which brought them various benefits. E-mail was used as a pedagogy of teaching and learning, medium of communication and tool for different purposes like academic purposes, general query and query for personal development, socializing, complaining and suggesting ideas. The use of e-mail was influenced by factors like gender, personality, experience in using e-mail and the features of the e-mail itself. However, the problem faced by the students such as slow downloading or server problems, limited number of computers for use, limited number of computer labs, many of the computers in the polytechnic were not working properly, crowded computer lab, compact personal time table, lecturer to students ratio was too high, difficult to understand the description, do not have enough money to surf at Cyber Café and no free or confirmed access to Internet in Polytechnic have influenced the use of the electronic mail in the teaching and learning of a technical subject among Polytechnic Ungku Omar students

ABSTRAK

Melalui penggunaan teknologi dalam pendidikan, proses pengajaran dan pembelajaran yang efektif akan dapat dicapai. Dalam projek ini, penyelidik ingin mengenalpasti sama ada penggunaan mel elektronik dalam pengajaran dan pembelajaran subjek teknikal akan membawa faedah ataupun tidak. Di samping itu, penyelidik juga ingin mengenalpasti masalah yang dihadapi dalam mengaplikasikan penggunaan mel elektronik dalam pengajaran dan pembelajaran subjek teknikal di kalangan pelajar Politeknik Ungku Omar. Responden kajian ini merupakan salah sebuah kelas di Politeknik Ungku Omar yang mengambil subjek Komunikasi Data. Terdapat dua jenis pendekatan kajian yang digunakan dalam proses mendapatkan data iaitu pendekatan kualitatif dan pendekatan kuantitatif. Data kualitatif termasuklah data yang dikumpulkan melalui pemerhatian, temu bual dan analisis kandungan. Data kuantitatif pula termasuklah data yang dikumpulkan melalui soal selidik. Data yang dikumpulkan menunjukkan peserta-peserta menggunakan mel elektronik dalam pelbagai cara yang akhirnya mendatangkan pelbagai faedah. Mel elektronik digunakan sebagai pedagogi pengajaran dan pembelajaran, medium komunikasi dan peralatan untuk pelbagai tujuan seperti akademik, pertanyaan, bersosial, mengadu dan memberikan idea. Penggunaan mel elektronik dipengaruhi oleh faktor seperti jantina, personaliti, pengalaman dalam menggunakan mel elektronik dan ciri-ciri mel elektronik. Walau bagaimanapun, masalah yang dihadapi seperti masalah server, kekurangan makmal komputer dan komputer, komputer tidak berfungsi dengan baik, makmal komputer yang sesak, jadual peribadi yang padat, nisbah pensyarah terhadap pelajar terlalu tinggi, susah untuk memahami penerangan, masalah kewangan dan tidak ada akses yang percuma di Politeknik telah mempengaruhi penggunaan mel elektronik dalam pengajaran dan pembelajaran subjek teknikal di Politeknik Ungku Omar.

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LIST OF ACRONYMS

CMC	-	Computer-Mediated Communication
E-mail	-	Electronic Mail



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CHAPTER I

INTRODUCTION

1.1 Introduction

Through the use of technology in education, effectiveness in the teaching and learning process can be achieved. According to the US Department of Education 1995 forum, many advantages can be achieved through the use of technology in the teaching and learning process as in the following statement:

"Technology can enhance the achievement of all students, increase families' involvement in their children's schooling, improve teachers' skills and knowledge and improve school administration and management."

It is because through the use of technology, teacher can learn how to develop teaching material by using web and other interesting teaching material and students will be more motivated with the use of the new teaching material. Through the use of facilities available in Internet such as e-mail, school administrations can communicate with each other easily and this facilitates the management of the

school. With the use of technology, parent can monitor their children's schooling easily.

How technology can enhance student's achievement can be seen in four aspects. The aspects are basic skills instruction, advanced skills instruction, assessment of student progress and student motivation (US Department of Education forum, 1995). Basic skills instructions include teaching multi-media software to the students and distance learning. Advanced Skills instruction includes students learning about interactive technologies like the Internet and problem solving skills. Assessment of student progress is done with active participation from the student. Student's motivation includes the involvement of family members and the student will like it better.

Electronic mail is one of the Information and Communication Technology (ICT) that can be used in the teaching and learning process (Vilmi, 1995; Baharuddin Aris, *et al.*, 2000; Graham and Scarborough, 1999). The computer is the main medium in applying the electronic mail in the teaching and learning process. The importance of computer can be seen through EPF scheme which enable EPF saver to use a certain amount of the money in buying a computer. According to Datuk Chan Kong Choy, deputy of finance minister, government effort in carrying out the campaign 'one house, one computer' is a good effort in developing more computer literate citizens. (Utusan Melayu, 2001)

According to Carmen de Pablos Heredero, *et al.* (2002), uses of electronic mail eliminate the identity barriers in relationship with time and space. This means that our behavior and thought are affected by the way in which people use the technology. According to Carmen de Pablos Heredero, *et al.* (2002) also, electronic mail is defined as a way to exchange information where messages can be sent from a personal computer or terminal to another via modem and telecommunication systems. The use of electronic mail as a communication tool for academic and personnel relationship started since 1970. It was seven years after the use of

electronic mail started with ARPANET (as an Internet precursor) in 1963.

Electronic mail is an electronic means which enables a fast communication between sender and receiver. Some of advantages identified by Carmen de Pablos Heredero, *et al.* (2002) were stated below:

- a) receiving and sending messages are very fast
- b) reliability in the reception and sending of messages
- c) sender and receiver does not need to be at a specified place
- d) messages is easy to store, resend and integrate
- e) low cost

Electronic mail is one type of Computer Mediated Communication (CMC). Communication with electronic mail is asynchronous with communication being over an extended period of time. According to Cullimore (1999), the theoretical advantage of CMC tools for teaching is that they widen the community of learners. This means that it can connect many learners in the teaching and learning process. Learners can send and receive messages at their convenience.

Research done by Belisle (2002) showed that by using computers, students can become better problem solvers and better communicators. It is because learners can create, analyze and produce information and ideas more easily and efficiently. This advantage will help the students to handle problem faced in their daily life.

However, the use of electronic mail also has some disadvantages. According to Kenji Kitao and S.Kathleen Kitao (2001), one of the disadvantages of e-mail is that the receiver of the message sent cannot see the sender of the messages and this makes it difficult for the receiver to understand the sender emotions such as anger, sadness and happiness. Thus, it may be difficult to understand what the writer or the sender of the message means.

The use of electronic mail in the teaching and learning of a technical subject can help learners to prepare for their future. This is because according to Belisle (2002), electronic mail is now becoming the communication tool of choice of many white collar workers in industrialized countries. Electronic mail is taking the place of voice, paper and fax communication. Nowadays, it is one of the employability skill required by the employers.

1.2 Statement of Problems

In the era of globalization, the development of information technology is increasing. Malaysia which is developing in the field of information technology will require more students who are computer literate. The requirement is necessary in order to ensure the success of vision 2020 (Dublin Unting cited from Utusan Sarawak, 1999). Although educational technology has been developed, there are still many lecturers using the traditional system only (Harun Arrasyid, 1977; Rohaty Mohd Majzub, *et al.*, 1990). Although there are many advantages of using educational technology but there are factors that prevent the use of technology in the teaching and learning process (Mohd Sarif Abd Manap & Ahmad Jaffni H.M. Hassan, 1996). From an interview conducted with the ex-students of polytechnics in Malaysia who are now studying in Kolej Universiti Teknologi Tun Hussein Onn, below were the problems that they faced during their studies at the polytechnic (Former polytechnic students, 2002):

1. Feel shy to express their opinions during class session
2. Some of the students feel that traditional chalk and talk method is not sufficient but it depends on the subject taught
3. Traditional ways of teaching consume time
4. Internet facilities are not enough
5. Use a lot of money in printing and binding the assignments

6. Having problem in finding extra reading materials because not enough reference books from the library, can borrow the books for a certain time period only and most of the books are old books.

In this research, I want to identify whether the usage of electronic mail in the teaching and learning of a technical subject will benefit the teaching and learning process as well as the problems faced in applying the electronic mail in the teaching and learning of a technical subject among polytechnic Ungku Omar students.

1.3 Objectives

The objectives of the research are:

1. To identify whether the usage of electronic mail will benefit the students in the teaching and learning of a technical subject or not
2. To investigate how students would use the electronic mail in their daily communication on a technical subject
3. To identify problems faced in using electronic mail in the teaching and learning of a technical subject

1.4 Research Questions

The research questions of the research are:

1. What are the benefits that can be gained by applying electronic mail in the teaching and learning of a technical subject?
2. How would students use the electronic mail in their daily communication on a technical subject?
3. What are the problems faced in applying electronic mail in the teaching and learning of a technical subject?
4. What are the perceptions of polytechnic Ungku Omar students towards the use of e-mail in the teaching and learning of a technical subject?

1.5 Importance of the Research

This research is being done to expose and to arouse administrations people regarding the importance of using e-mail in helping lecturer and student of polytechnic in the teaching and learning process. The importance brought about by this technology can be seen from students' side, lecturers' side as well as polytechnic's side.

1.5.1 Students' Side

The usage of e-mail is hoped to be able in increasing the understandings of the students towards the teaching materials. Learning process is hoped to be more effective and efficient through the usage of e-mail in the teaching and learning process. With this, students will be more motivated in their studies and will achieve good result. Research done by Belisle (2002) showed that by using computers, students can become better problem solvers and better communicators.

1.5.2 Lecturers' Side

This research is hoped to help the lecturers realize about the importance of e-mail in the teaching and learning process. Other than that, lecturers can prepare themselves to face the challenge of information technology in increasing the quality of teaching. If through the research, it is proven that the usage of e-mail will bring benefit for the students, then lecturers can apply the same method in their teaching. In order to use the technology effectively, lecturers needs to read a lot about the current technologies and their advantages as well as ways in implementing the technology in the teaching and learning of technical subjects. According to Kunde (1998, cited from Shelton and Lane, 2001), "many colleges and universities are now eagerly working to prepare experts who can facilitate use of the Web and extend employment horizons for students."

1.5.3 Polytechnic's Side

This research is hoped to help identify the problem faced by the students regarding the facilities provided while using the e-mail in learning a technical subject. With this information, the administration of polytechnic can try to solve the problem for the sake of the students. For example, if the computer with internet facilities is not enough, maybe the polytechnic can provide more computers with internet facilities. In another words, we can say that the research will help the polytechnic in the future planning. According to Shelton and Lane (2001), three important things that should be considered when implementing CMC into the classrooms which are access for all students while remaining cost effective, judicious use and pay attention to potential consequences.

1.6 Limitations of the Research

Population of the research is one class of students at Politeknik Ungku Omar (PUO) who are taking Diploma in Information Technology. Exposure to online learning will be carried out with the students in order to achieve the objectives of the research. The research is limited to the technical subject only. Due to the limitation of time, the research will be carried out with the students for four weeks only.

1.7 Definition of Terms

Below is the definition of terms that will be used throughout the report.

1.7.1 Learning

Learning is said to be happening if we can see the changing of behavior within the individual. It is also said to be the result from the experience and interaction with the environment that will increase the enduring level of individual in facing the daily life. (Baharuddin Aris, *et al.*, 2000)

1.7.2 Teaching

Teaching is the process of overt selection and arrangement of information, activities, method and media in helping students to identify the objectives of learning. It is also a process of choosing the valid and reliable information and arranges the information according to the need of the students. It is also defined as a process of choosing the right teaching strategy and teaching aids for the certain topic. (Baharuddin Aris, *et al.*, 2000)

1.7.3 Educational Technology

“Educational Technology is the application of the scientific knowledge about learning and the condition of learning, to improve the effectiveness and efficiency of teaching and training. The absence of scientifically established principles, educational technology implements techniques of empirical testing to improve learning situations.” (National Center for Programmed Learning, United Kingdom cited from Baharuddin Aris, *et al.*, 2000)

1.7.4 Electronic Mail

“Electronic mail is an electronic tool for sending and receiving messages via a computer. Depending on the specific e-mail program, you might also be able to exchange files, create and use mail ‘group’, maintain personal and shared calendars, and much more.”

(Loyola University Chicago, 1997)

Also,

“Electronic mail is the generic term given to the various methods by which personal messages can be sent from one computer user to another given some type of electronic data link” (Pride, 1994:1)

1.7.5 Internet

“Internet is the international network of networks which links academic and public institutions.” (Pride, 1994: 42). This means that Internet helps to connect people from all around the world.

1.7.6 Computer-Mediated Communication

According to Romiszowski and Mason (1996), Computer-Mediated Communication (CMC) can be defined as communication between different areas which are separated by time and space and only being connected through computer network. CMC also represent different kinds of systems that enable one individual

to communicate with others through computer in the network system. Examples of CMCs that are available are electronic mail, video conferencing, discussion list and bulletin board. (Baharuddin Aris, *et al.*,2000)

Operational definition of CMC in this research is asynchronous electronic mail by which senders encode text messages that are relayed from senders' computers to receivers.

1.7.7 Information Technology

Information technology refers to all forms of technology applied to processing, storing and transmitting information in electronic form. The physical equipment used for this purpose includes computers, communications equipment and networks, fax machines and even electronic pocket organizers. (Lucas, 1997: 7)

1.7.8 World Wide Web

“World Wide Web also referred to as WWW, W3 or the web. It is a suite of program which provides a hypertext view of the Internet's resources. A Web server runs the WWW software and manages the storage and retrieval of Internet documents; a Web browser run on the computer connecting to the server and handles the display of WWW pages with different fonts, colour-coded hypertext links and pictures.” (Pride, 1994: 44)

1.7.9 Use

In this research, use referred to the use of e-mail for purposes like learning, communicating between lecturer and students as well as between student and student.

1.7.10 Data Communication

Data Communication is the exchange of data (in the form of 0s and 1s) between two devices via some form of transmission medium such as wire cable. (Forouzan, *et al.*, 1998)

1.7.11 Polytechnic Ungku Omar

Polytechnic Ungku Omar is one of the learning institutions under Malaysia Ministry of Education. It gives training to SPM and SPMV holders so that they will become a technician in different engineering fields.

1.7.12 Technical Subject

In this research, technical subject referred to subjects like operating system, Data communication, Mathematic and Networking that has been offered at polytechnic Malaysia.

1.8 Conclusion

In this chapter, I have mentioned the statement of problem, objective as well as research questions for my research. All these aspects will be guiding me throughout my research. The definition of terms give helps for the reader to more understand about my research.



CHAPTER II

LITERATURE REVIEW

2.1 Introduction

Nowadays, information and communication technology has brought about many changes in human life including the education world (Baharuddin Aris, *et al.*, 2000; Jamaludin Mohaiadin, 2000). Some of the communication facilities provided today are searching information by using search engines such as Altavista, HotBot and Yahoo, group discussion using Newsgroup and Nicenet, electronic mail and chatting. Each of these facilities has their own features that will provide good effect in the teaching and learning process. According to Baharuddin Aris, *et al.* (2000), usage of the Internet in the teaching and learning process enables students to gain more knowledge because the Internet creates a world without border. Students can gain access to the information from any place and at any time convenient to them. This chapter will discuss some research done about e-mail in the teaching and learning process, some theories of learning and concepts that are related to this research, face-to-face method compared to computer-mediated communication as well as relation between computer-mediated communication and collaborative learning.

2.2 Theories of Learning

I will discuss three theories of learning which are theory of behaviorism, theory of information processing and theory of constructivism. According to Wiersma (1995), “A theory is a generalization or series of generalizations by which we attempt to explain some phenomenon in a systematic manner.”

2.2.1 Theory of Behaviorism

The Theory of Behaviorism in learning is said to be different from constructivism. According to Murphy (1997) and Glover and Bruning (1990), theory of behaviorism is more towards the study of changes in behavior aspect that can be seen and is not the study of changes in mental states.

Below is the definition of learning as defined by Murphy (1997):

“Learning is conceived as a process of changing or conditioning observable behavior as result of selective reinforcement of an individual’s response to events (stimuli) that occur in the environment.”

Behaviorists insist on gaining knowledge of natural world by the students. The lecturer’s role is to transmit the knowledge of the natural world to the students. This means it is toward instructionist approach where the teacher directs and controls the teaching and learning process. Sometimes the term behaviorism is used

synonymously with objectivism. Jonassen (1991 cited from Murphy, 1997) describes the assumptions of an objectivist approach to learning:

“Objectivists believe in the existence of reliable knowledge about the world. As learners, the goal is to gain this knowledge; as educators, to transmit it. Objectivism further assumes that learners gain the same understanding from what is transmitted. Learning therefore consists of assimilating that objective reality. The role of education is to help students learn about the real world. The goal of designers or teachers is to interpret events for them. Learners are told about the world and are expected to replicate its content and structure in their thinking.”

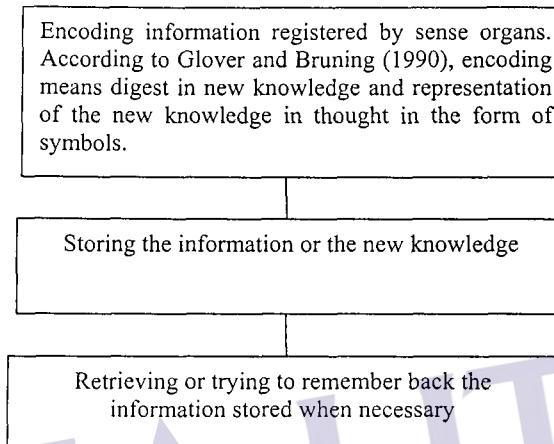
From the above assumptions regarding objectivist approach to learning, we can say that objectivists also insist on gaining knowledge of natural world and it is the responsibility of educators to transmit the knowledge of natural world to students.

Behaviorism is more towards external behaviors that can be observed and not towards cognitive approach such as the theory of constructivism. The different theories of learning result in many different aspects such as the way in which knowledge is conceived and acquired, the types of knowledge, the responsibilities of the educators and skill or activities emphasized.

2.2.2 Theory of Information Processing

According to Dellarosa (1988 cited from Glover and Bruning, 1990), “information processing theory portrays humans as active processors of information

and states that memory cannot be studied without understanding what the learner does with new information and how meaningful the information is to the learner. In this theory, human beings are seen as information processing systems.” This implies the following process of a memory:



(Source: Glover and Bruning, 1990)

Figure 2.1: Process of a Memory

From Figure 2.1, we can conclude that students' memory depends on how elaborate they encode information. This means that if students apply many ways in encoding the learning materials, their memory for the information should improve. Educators must make sure that students are active processors of information and not only receiving the teaching material without analyzing it.

2.2.3 Theory of Constructivism

According to Bruner (2001), the definition for theory of Constructivism is stated as below:

“A major theme in the theoretical framework of Bruner about theory of constructivism is that learning is an active process in which learners construct new ideas or concepts based upon their current/past knowledge”.

This implies that theory of constructivism stressed on active learning where students' role is more important compared to teachers' role. Students need to gain new knowledge based upon their current or past knowledge.

Due to this theory, lecturers should try their best to encourage their students in finding new principles on their own effort. In order to achieve the objective, the lecturers and students must have an active dialog. When delivering the learning material to the students, it must always base on the current knowledge and understandings of the students.

According to Bruner (2001), a theory of instruction should be covering four major aspects as stated below:

1. Predisposition toward learning
2. The ways in which a body of knowledge can be structured for the easiness of the students in understanding it
3. Presenting the material in proper or effective ways
4. Placing of rewards or punishment

We can conclude that a teacher should encourage students in gaining knowledge on their own effort. However, teachers' role is also important. They must encourage students by using a structured teaching strategy such as listed above.

Good ways of delivering knowledge will have the effects of simplifying, generating of new propositions and increasing the manipulation of information. According to Glasersfeld (1992) and Murphy (1997), the role of the lecturer is not only delivering the teaching material and knowledge to the students. They should ensure that students have opportunities and incentives to build up the knowledge gained in the class.

As a conclusion we can say that from the constructivist perspective, whatever one lecturer wants or intends to teach must never be presented as the only possible knowledge. Students must be given their own chances in gaining more knowledge on their own. With the realization of social construction of knowledge, constructivist suggests methods such as discussion and collaboration in gaining more knowledge. From here, we can say that Theory of Constructivism stressed more on students' role compared to teachers' role. However, teachers should ensure that students have the opportunity in gaining more knowledge on their own effort. For examples, giving individual assignment and group assignment and hoping they will try their best in finding extra materials for doing the assignments.

2.3 Ethnography

Main focus of ethnography research is what the culture of a group of people is. According to Patton (1990), ethnographic research is based on one assumption. The assumption is every human group that is together for a period of time will evolve

a culture. According to Goodenough (1971 cited from Patton, 1990), the definition of culture is as stated below:

“Culture is that collection of behavior patterns and beliefs that constitute standard for deciding what is, standards for deciding what can be, standards for deciding how one feels about it and standards for deciding what to do about it.”

The primer method used by ethnographers in doing their research is observation. There are two types of observations which are observed from a distance whereas the other one is participant's observation. Ethnographers usually use the latter one. Participant observation means the ethnographer also join in with the participants who they are studying to gain insight into cultural practices and phenomena. In making sure the success of the process, ethnographers must be able to make field notes.

Chiseri-strater and Sunstein (1997 cited from Hall, 1999), listed what should be included in the field notes:

1. Date, time and place of observation
2. Details of events at the site
3. Sensory impressions such as sounds and sights
4. Personal responses about details of events
5. Summaries of conversation
6. Questions about the observation for future research
7. Page number

After getting the information at the field site, the next thing to do is analyze the data. Hall (1999) suggested some ways in analyzing ethnographic data. Below are some of the ways:

1. Read through all information gathered through interview, observation and other data gathered
2. Study the data gathered and make notes about any patterns, connection, similarities or contrastive. The task can be facilitated by using computer-assisted data analysis program
3. Come up with a list of “local categories” from the data
4. Test the categories and explanation that have been made so far
5. In order to confirm the data, use triangulation concept. This means triangulating different forms of data that have been gathered
6. Try to validate what has been learned through the research with the informants. However what informants said may not be meaning that we are correct or wrong.

In ethnographic research, ethics is an important aspect because the research takes place among real human being. Researcher has to make clear their research goal to the people involved and informed consent in carrying out the research. The research done must not be harmful to anyone. The standard for ethical ethnography research is The American Anthropological Association’s statement on the professional ethics.

2.4 Computer-Mediated Communication (CMC)

According to Romiszowski and Mason (1996 cited from Baharuddin Aris, *et al.*, 2000), CMC can be defined as communication between different areas which are separated by time and space and only being connected through computer network. CMC also represent different kinds of systems that enable one individual to communicate with others through computer in the network system. Examples of CMC that are available are electronic mail, video conferencing, discussion list and bulletin board.

There are three important characteristics of CMC as mentioned by Baharuddin, *et al.* (2000). The three characteristics are high interactive communication, multiple direction communication and the last one is synchronous and asynchronous communication. CMC provides high interactive communication by having high involvement of individuals and high interactive between the individuals. CMC enables flexible interaction process through the existence of virtual discussion facilities. The characteristic of CMC system about multiple direction communication enable students to interact with each other. Through the interaction, students can gain more knowledge in helping them in their studies. Synchronous communication means students can communicate in real time whereas asynchronous communication means communication among the students are not in the real time.

As mentioned by Baharuddin Aris, *et al.* (2000) and Cheol-Houn Lee (1999), CMC is divided into two communication modes which are asynchronous mode and synchronous mode. Examples of asynchronous mode are e-mail, news groups, BBS(Bulletin Boards) and threaded discussion groups whereas examples of synchronous modes are IRC (Internet Relay Chat) and Multiple user Dungeons (MUDs) and video conferencing. According to Cheol-Houn Lee (1999), asynchronous CMC enable individualized learning which means that students can fix their own time in reading, understanding and responding to the written message that they received in text-based mode. Since the communication is in a text-based mode, students can monitor and edit their or other participants' text-based dialogue structures. The usage of CMC asynchronous communication can be seen in the domain of collaborative writing, brainstorming and arouse critical thinking among the participants. However, CMC asynchronous communication also has some disadvantages. The participants cannot get immediate feedback from other participants because they have to wait until the recipients open and read the messages their sent. This delay can cause the participants to feel frustrated and boring. Finally, participants cannot practice oral communication within the asynchronous mode itself because participants communicate among them with messages that are in text-based mode.

From the definition given by Baharuddin Aris, *et al.* (2000) and Cheol-Houn Lee (1999), it can be concluded that by using CMC, we can communicate with each other easily which make us feel that we are not a lonely person, communication with other also can inspire the participants to create their own new ideas after exchanging ideas with others, can help each other in studies by communicating through CMC and increase the students confidence and competence because they can keep up with the progress for the area of interest.

2.4.1 CMC and Collaborative Learning

According to Graham and Scarborough (1999), collaborative learning is defined as in the following statement:

“Collaborative learning refers to the acquisition of knowledge, skills or attitudes, that takes place as a result of people working together to create meaning, explore a topic, or improve skills. More formally, it emphasizes the cooperative effort between students and the generation, rather than transmission of knowledge. Social and intellectual interaction is highlighted. It differs from other group work due to its emphasis on highly structured techniques to ensure interdependence within groups while maintaining individual accountability.”

Through the use of CMC in collaborative learning, participants can exchange ideas easily at any time in any place convenience for them. Vygotsky(1962 cited from Warschauer, 1997) stressed that collaborative learning among students or collaborative learning between students and a teacher was very important for assisting students in advancing through their zone of proximal development. Zone of

proximal development means the gap between what they could accomplish by themselves and what they could accomplish in cooperation with others. This means that through collaborative learning, students can achieve more benefits compared to working alone by themselves. A learner who makes a comment online is part of the learning environment but those who read only and do not make a comment are not considered as part of the learning environment. For example is the usage of e-mail in the learning process. When a student checks the mail and reply the mail, then it is considered as part of the learning environment. However, if the student checks the mail and does not reply the mail, then it is not considered as part of the learning environment.

According to Warschauer (1997), the potential of computer-mediated communication in the learning and teaching process can be seen from five features of CMC that differentiate it from the other communication media. The features are that CMC is text-based and computer-mediated, many to many, time and place independent, long distance and the last one is distributed via hypermedia links.

2.4.1.1 Text-based and Computer-mediated

Writing could be analyzed and accessed by participant at any time. Participants also can analyze and access the writing again and again which means it is not limited to one time review only. Students' interactions in computer-mediated form enable them to transmit, store, archive, re-evaluate, edit and rewrite the contents easily. This is mentioned by Cheol-Houn Lee (1999) also.

2.4.1.2 Many to Many Communication

This means that any member of a group may communicate with any or the entire member of the group. This feature enables a group of people to construct new

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